



UNITED STATES PATENT APPLICATION

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TITLE: METHOD AND APPARATUS OF OPENING AND CLOSING A BI-FOLD DOOR

CROSS REFERENCE TO RELATED APPLICATION

This application is a division of U.S. Patent Application Serial No. 09/314,529

filed May 19, 1999.

1. A method of opening and closing an opening in a structure with a bi-fold door having first and second panels, means movably mounting the first panel on the structure, hinges connecting the first panel to the second panel to allow the first and second panels to be moved from generally vertically aligned positions closing the opening to side-by-side folded positions opening the opening, and door lift devices having rotatable members having a common axis of rotation operable to selectively open and close the bi-fold door comprising: connecting the rotatable members to one panel with elongated flexible webs, aligning each web normal to the axis of rotation of a rotatable member, maintaining the alignment of the web with the rotatable member to ensure an overlapping relationship of the web around the rotatable member, simultaneously rotating the rotatable members in one direction with a power unit at a constant rate of speed to wind the webs in overlapping relation around the rotatable members, maintaining the alignment of the webs with the rotatable members during rotation of the rotatable members in the one direction to wind the webs around the rotatable members to ensure overlapping relationship of the webs around the rotatable members to move the first and second panels at an increasing rate of speed from a closed position to an open position, rotating the rotatable members in a direction opposite the one direction at a constant rate of speed to unwind the webs from overlapping relationship around the rotatable members, and maintaining the alignment of the webs with the rotatable members during rotation of the rotatable members in the direction opposite the one direction to unwind the webs from the rotatable members to maintain the overlapping relationship of the webs on the rotatable members during unwinding of the

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webs from the rotatable members to move the first and second panels at a decreasing rate

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of speed from an open position to a closed position.

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18. A method of opening and closing an opening in a structure with a bi-fold door having hinged panels, means movably mounting the door on the structure for movement between a down closed position to an up open position, and a door lift device having a rotatable member driven with a reversible electric motor to selectively move the door between the closed and open positions thereof comprising: connecting the rotatable member to one panel of the bi-fold door with an elongated flexible web, guiding the web with laterally spaced annular plates located adjacent the opposite ends of the rotatable member and a web accommodating slot in a shield located around the rotatable member to maintain an overlapping relationship of the web around the rotatable member, rotating the rotatable member in one direction at a constant rate of speed to wind the web in overlapping relation around the rotatable member, guiding the web with laterally spaced annular plates secured to the rotatable member and a web accommodating slot in a shield around the plates during rotation of the rotatable member in one direction to ensure overlapping relationship of the web around the rotatable member to move the door at an increasing rate of speed from the closed position to the open position, rotating the rotatable member in a direction opposite the one direction at a constant rate of speed to unwind the web from overlapping relationship around the rotatable member, and guiding the web with the laterally spaced annular plates and the web accommodating slot in the shield around the plates during rotation of the rotatable member in the direction opposite the one direction to maintain overlapping relationship of the web on the rotatable member during unwinding of the web from the rotatable member to move the door at a decreasing rate of speed from the open position to the closed position.